The Direct Depiction Ability of Language
Experimental Validation of a Theory

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KOGNITIONSVETENSKAPLIG FORSKNING

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Abstract Human language ability is usually seen as an effect of a sudden leap in genetic mutation that equipped man with a frame of generative rules for language production. Noam Chomsky's idea implies that communication between people and over time would be a matter of agreeing on what categories shall be put into the framework. Thus, a skeptical attitude towards the depicting ability of language can be found among scholars who adhere to this agreement. However, the premise of the present article is that language should not be confused with grammar. The idea is that an unknown magnitude called intentionality controls textual production. The intentional dimension is hidden in syntax, although it evolves by text production like any other biological system that is founded on natural law. Perspective Text Analysis (PTA/Vertex) has been developed to detect the biology of language and texts. The method was used in an experiment that could show evidence of "direct depiction" of a conceptual structure of a text because of its known theoretical ground. Based on this evidence, a poem with unknown conceptual structure by a Nobel Laureate was put to the test to prove its theoretical foundation. When it was matched against the short Nobel Prize motivation, formulated by experts in literature, duality between the motivation text and the poem became evident, which strengthens the theory of the "direct depiction" ability of language.

Ever since the beginning of philosophy and science, the ability of language to represent an internal or external reality has been questioned. There have been historical periods when a sceptical attitude toward the use of words was prevailing and periods when the word was highly respected in human communication, such as in the Humanism movement of the Renaissance. One reason for the sceptical attitude was the belief that "The Word" is given by a divine power and that communication is an act that takes place in an internal dialogue between the Divine and the human mind in a vertical relationship. It follows that interpersonal communication is by necessity imperfect, since no one is capable of mediating some true meaning to someone else by means of words. Only the poet is, through his inspiration (Olsson, 1995, p. 29).

With the great discoveries and the development of society, a language was needed to convey currently relevant conditions, a reason why one had to reject poetry as means of knowledge. The effect of the entry of the New World was therefore a doubtful attitude towards the word itself. Real knowledge could only be conveyed through the language of mathematics, it was said. It is a conception that is still alive and goes back to ancient times, where the Greek philosophers discussed whether language was for gods or for humans. They were the first to realize that the human language tells about man himself but they could not use that knowledge for the good of humanity. In their belief in language as divine, pure, universal and impersonal, they threw out the human component from their models and claimed to have formulated its essence in logical expressions. A step towards a terrestrial attitude was taken during the Romanticism, where the idea of the animated Nature made the poets create a vocabulary suited for mediating the Divine on earth.

In different ways, the time of Enlightenment is a boundary line. The proclamation of "Death of God" in the 19th century was a maxim that paved the way for the genre of prose and the great novel writers. This turning point should have had far-reaching consequences for the view on language and its modelling. It simply means that a language act can no longer be

perceived as divinely inspired, which in turn affects the assumption of "meaning". The vertical approach to language should have been broken in favour of a horizontal to correspond to the change. Still, however, the Subject-Verb-Object model is the predominant in grammatical description, which means that the object (the Word) is the governing component and that a semantically determined relation is bonding subject and verb: $S \leftrightarrow V \rightarrow O$. This is the prevailing model in linguistics, but no model of language, since it can process only one kernel sentence and does not presume any underlying intentionality (I. Bierschenk, 1995).

However, if it is acknowledged that higher powers should not be responsible for human actions, then the model must be changed and some divinity be replaced by consciousness, self-reference and responsibility. The starting point for action is then the person himself. Hence, subject must be replaced by agent, and the reality that the language should represent must be expressed through the Agent-action-Objective model: $A \rightarrow a \rightarrow O$. This change means that the agent controls the communication process. In addition, an outer parenthesis is needed to let the model incorporate text production: $(A \rightarrow (A \rightarrow O))$.

Through this profound change in the view on natural language, linguistic meaning refers to the reality in which people live. Reality can only be as accurately depicted as it presents itself to the agent and as the agent perceives it. Such a view has nothing to do with universality, but with realism. Language incorporates its own coordinate system, namely the intention axis, which has the steering function, and the orientation axis (first outlined in B. Bierschenk, 1984). Intentionality shall not be confused with a speaker's or a writer's purpose, rather it is unconscious to the agent but emerges when a text is produced. Against this background, the premise of the present article is that natural language is a natural phenomenon. It has an evolutionary history and develops irregularities just like any one biological system. Its meaning can only evolve and be detected through the directionality that is hidden in the syntax, not in the individual words (I. Bierschenk, 1989).

As will be obvious in the following, there are two main sources underlying this language and text concept, namely the Kantian AaO-axiom regarding the basics of language (B. Bierschenk, 1991, 2001 a, b, 2018) and the Gibsonian ecological theory of visual perception regarding text as flow (Gibson, 1979). Their similar approach to analysing the relationship between human coordinative ability and the incorporation of the environment in the development of mind and moral was fruitful. Although Gibson did not want to admit any influence from Kant, it is evident that he too acknowledges the innate coordinates for developing invariants in the forming of the kind of space that embodies consciousness, awareness and the notion of self. Gibson (1979, p. 3) writes: "For if you agree to abandon the dogma that 'percepts without concepts are blind' as Kant put it, a deep theoretical mess, a genuine quagmire, will dry up". The AaO on text has been operationalised in Perspective Text Analysis (PTA/Vertex). For the geometrical calculation and graphical description, in particular Hestenes (1986/1993), Connes (1994), Greene (1999), and Wales (2003) have been helpful.

Version Vertex connects to string theory and the mathematics developed for measuring distance in space and further to the discovery of topological phase transitions (e.g., B. Bierschenk, 1993/2013, 2000, 2011; I. Bierschenk & B. Bierschenk, 2004, 2011). Thus, it comprises both a theory of language and a theory of text (I. Bierschenk, 1985, 1989, 1999/ 2003, 2000, 2011, 2019). Manuals in six languages are available.

Perspective Text Analysis (PTA/Vertex)

PTA/Vertex has been designed to detect the internal dynamics in a text, which does not have a direct connection to the visible surface. The smallest units in this analysis are the graphemes. The analysis creates a flow chart of how strings of graphemes are manifested and interwoven in the text building, a process that is invisible when a person speaks or writes.

This protocol uncovers the mechanism that shows the gaps in the flow that creates disparities and determines how the gaps should be filled for the weave to be complete. The mode of action of this instrument involves a visualization of the invisible.

A text flows in a time-bound rotating movement and rhythmically. Two components operate in this space creation, namely the Agent [A], which has its position before the verb in the clause, and the Objective [O], which has its position after the verb. Once a verb is identified, the positions x and y can be resolved (Ø v Ø) algorithmically. These positions are fixed and independent of semantics. This agent does not correlate with a grammatical agent or a person. The two components rotate with and against each other during the process, and create the contours of a text space (image), that is, the full textual extension. When this is summarized graphically, it is based on the distance between the values, which form a wave. The flow dynamics in [A] and [O] may then be studied separately, without their mutual dependency being destroyed.

In the next step, it will be a matter of getting an image of the intricate structure of the text, which establishes concentrations of information. The results of this more abstract level is called Intention, governed by the Agent component and Orientation, governed by the Objective component. Information is calculated by means of a fusion mechanism and is based on the distance between the attractors in the net. The network thus formed builds up a landscape of mountains and valleys, which can have names like any topographical map. It shall be noted that any interpretation is not present in this phase. The names given to the energy clusters built up are the result of transformations that take place exclusively based on the asymmetrical collaboration of physical and virtual strings. An attractor name occurs temporarily but may return and enter into a new transformation at a later stage in the process. It follows that concepts in this analysis are empirical, unlike those formed by classification, which are subjected to semantically determined laws.

Depicting an Experimental Reality

One of the most famous experiments in ecological theory is "Visual Cliff". It builds on James J. Gibson's ecological theory of perception (Gibson, 1979). Eleanor J. Gibson and Richard D. Walk performed a series of experiments to find out whether infants have depth perception or not (Gibson & Walk, 1960). Their experimental device was designed to simulate the concept of depth by the construction of a risky terrain, consisting of a plane glass surface leading to an edge ending with a steep slope (cliff). A patterned material placed just underneath the glass gave the impression of solidity, whereas the same material placed at some distance below the surface at the other half gave the impression of depth. The device offered an environment where children could move. The glass had the effect that the transition from solid (shallow) side to deep side could not be judged by means of tactile feeling but could be perceived by the sight. The question was whether a young infant placed on the board would crawl over the glass surface when the mother called or if the awareness ("direct perception") of the scarp was to take over, that is, the virtual was real.

In their article, the researchers report on the experimental procedure and summarize the result of a long period of investigation in the form of a series of four pictures. Below the pictures, there is a text that functions as the synthesis of the entire experiment. This text will be the experimental text here. The purpose is to examine the degree to which the linguistic medium can depict the experimental reality. Since the theoretical aspects are well known, a positive outcome will be taken as evidence of the "direct depiction" ability of language. Here is how the original text is worded (Gibson & Walk, 1960):

CHILD'S DEPTH PERCEPTION is tested on the Visual Cliff. The apparatus consists of a board laid across a sheet of heavy glass, with a patterned material directly beneath the glass on one side and several feet below on the other. Placed on the centre board (top left), the child crawls to its mother across 'the shallow side' (top right). Called from the 'deep' side, he pats the glass (bottom left), but despite this tactual feeling that the 'cliff' is in fact a solid surface, he refuses to cross over to the mother (bottom right). (p. 65)
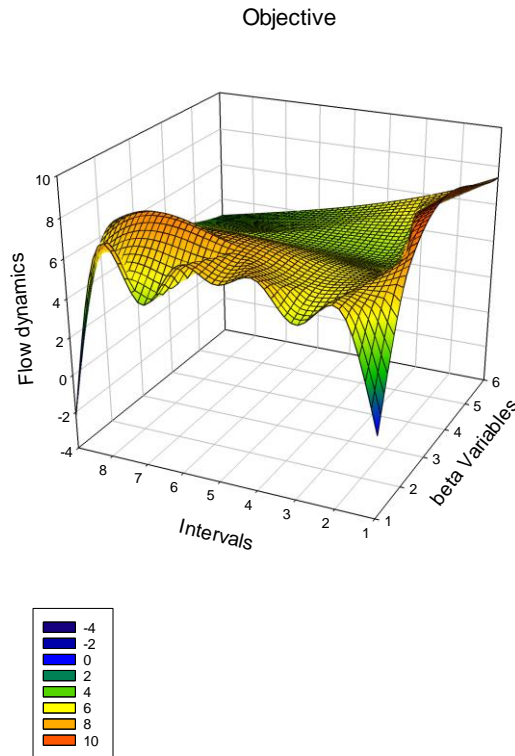

Figure 1 *Flow dynamics for Visual Cliff: Objective*

The textual flow in the objective of this text is displayed in Figure 1. Summed values from a set of string rotations are the input into a table based on the number of intervals (y-axis), the number of variables for (A) and (O) per interval (x-axis) and the radians (z-axis). These values are entered into an appropriate graph program (in this case SigmaPlot, 2014, Version 13.0), which will produce a graph per component. The program transmits data to a scale, representing the extension of the text. The entering of data from the table has taken place from the left as in normal reading. This means that the reading of the text development in the graph is done from the right instead. The first thing that can be observed in Figure 1 is that the unfolded text resembles partly a piece of rolling fabric, partly a plane, smooth texture. For the observations that will follow, the flow chart in Appendix, Table A1, should be helpful.

In the first interval, the first beta variable makes a distinct move down towards the zero-line while the second then makes a rapid upward move, which can be seen as a wing to the upper right in the graph being the highest point in the texture. This formation is caused by the strings (*... is ...*) and (*... tested on the Visual Cliff.*). The dip is caused by the implicit beta variable after the first verb, while the rest of the string sequence elicits higher magnitudes because of the explicitness and the number of graphemes and words within the component. In the ninth interval, the deepest point is $beta_{18}$. Its root is the combination of channelling at $alpha_{19}$ and the implicit strings at $beta_{19}$, since the first pointer (*over*) has its filling in the succeeding differentiation. Interval eight contains the next highest point, (*is in fact a solid surface*), marked as the powerful wave just before the last descent.

We are now going to examine how the graphic form represents the original text. The first interval describes the theme, where the objective is the researchers' name of the entire experimental concept. Implicit is the abstract relationship that they wish to grasp (and has grasped) but do not mention initially, hence the depth of the graph. The second interval describes the physical part of the device. The first two magnitudes are identical while the third, which has a differentiating angle, is slightly lower. Thus, the interval expresses stability, which corresponds to the actual nature of the glass sheet. Interval three describes the softer attributes of the device, that is, how the surface was manipulated with patterned fabric. Here the magnitudes change in the six variables, which are quite small differences, though. This variability underlines the angled change between the positions beneath and below the glass and the shift between the two halves.

After these shifts, three intervals (four, five and six) follow with very similar magnitudes. Now behavioural observations come into view, where the movements are expressed in a number of pointers (*on, two, across* and *from*). The child's attention is in all four objectives directed at the same attractor and the movements take place on one, safe side. The similarity between the values thus reflects the confidence that the child shows. Then something special happens, because the seventh and eighth intervals reflect that the movement becomes another. It begins with doubt, where the child makes a break and the tactile feeling takes over (lower magnitude). It continues with sensitivity being confirmed in a very expressive manner, thus marking the difference between the tentative initial stage and the properly processed information. Finally, sight becomes dominant. The implicitness in the ninth interval expresses something that is unknown to the child and to which the researchers do not provide words. Instead, they describe how the experimental factor "the lure" allows the observers to infer depth perception from the child's refusal at the cliff edge. The textual flow of the agent is described in Figure 2.
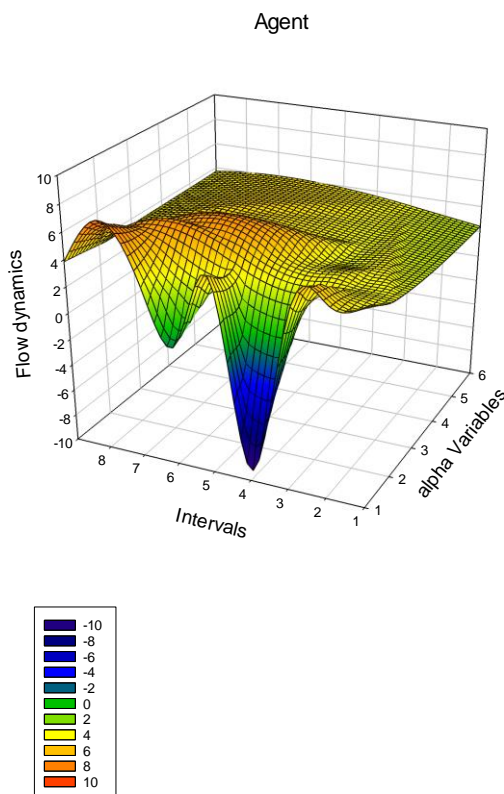

Figure 2 *Flow dynamics for Visual Cliff: Agent*

This graph shows a different form. It is no longer a matter of informing about equipment and materials. The agent graph says what is steering the objective flow. Thus, the first interval describes what controls the experiment, namely (*Child's depth perception*). In alpha$_1$, the string is explicit, while in alpha$_2$, it is implicit. Channelling continues after (*The apparatus*) in the second interval and is repeated until the device has been explained. Where the softer attributes are introduced at the objective side of alpha$_6$, the magnitude is repeated five times in the third interval, a steady standpoint corresponding to the fluctuations of the patterned material. Intervals five to seven, representing the behaviour in the objective, show an experimental shift in the sense that interval five materializes the experimental subject (*child, he*) as the agent on the glass sheet, while intervals four and six do not. Instead the writers leave an opening before the verbs, indicating that both preceding alpha + beta strands are governing the events on the glass, that is (*with a + patterned material directly ...*etc. *... on the other*) is the root and source of the placement and the call respectively. This experimental involvement is depicted in the form of two gaps descending. It follows that the fourth interval, at alpha$_{12}$, is the deepest point, while the dip in the sixth interval ($\approx$-0.84) does not cause any marked under-surface move. Interval eight contains the highest move in the agent. Thus, the strings (*but despite this tactual feeling that the cliff*) is the place in the text where the significant event occurs that steers the child's refusal. As the graph shows, this alpha variable is represented by a powerful wave, quite consequently.

A further step will be taken to represent the information structure. Figure 3 shows the fusion dynamics in the orientation dimension.
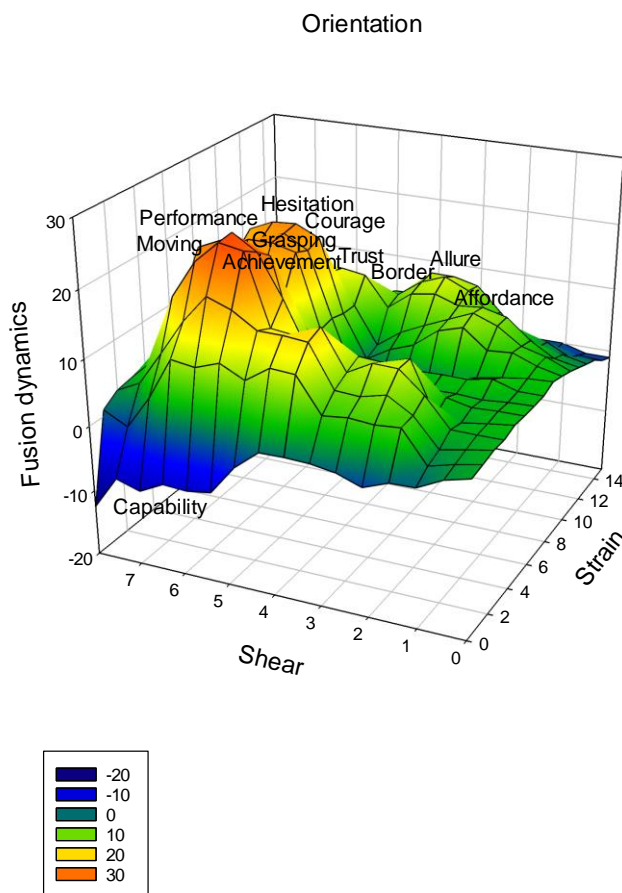

Figure 3 *Fusion dynamics for Visual Cliff: Orientation*

This graph is a visualization of the concentrated energy in the text, presented as a landscape of lower hills and a valley formed as a basin surrounded by groups of mountains of various height. Concentrations are mostly marked as sharp peaks or massifs but it often happens that a deep place in the structure is fused with a very high peak. Such an example exists in this structure.

Since the fusion process starts in the right corner and shall form a ring structure, it runs backwards and ends in the left upper corner of the graph. The principle of the fusion mechanism is that two string sequences are merged to form something third, a transformation, whose result is immaterial or virtual. The names given to the concentrations should reflect this abstract level. A transformation (T) can be included in a new fusion and an even stronger concentration is formed. To get started, we will follow a few of the initial transformations. They belong to the lower foothills with relatively low energy concentration.

X	Y	Node	Value	Transformation
5	**2**	**T_4**	**17.5698**	**Security**
5	2	T_4	17.5698	Security
1	1	T_1	6.0372	Exposure
5	**3**	**T_5**	**24.6519**	**Challenge**
6	0	6	4.8670	patterned material directly
7	0	7	5.6115	beneath the glass
7	**1**	**T_6**	**10.4785**	**Texture**
8	0	8	5.3793	on one side
9	0	9	4.5216	and several feet
9	**1**	**T_7**	**9.9009**	**Partiality**
7	1	T_6	10.4785	Texture
9	1	T_7	9.9009	Partiality
7	**2**	**T_8**	**20.3794**	**Support**
10	0	10	4.9149	below it
11	0	11	5.8457	on the other
11	**1**	**T_9**	**10.7606**	**Difference**
7	2	T_8	20.3794	Support
11	1	T_9	10.7606	Difference
11	**2**	**T_{10}**	**31.14**	**Border**
5	3	T_5	24.6519	Challenge
11	2	T_{10}	31.14	Border
11	**3**	**T_{11}**	**55.7919**	**Affordance**

In this region are found concepts reflecting the child's Exposure (T_1), the Impression (T_2) of the experimental arrangement, and its effect, such as the Solidity (T_3) of the glass. At the point where the process reaches Security (T_4) after the fusion of T_2 and T_3, it is transformed by Exposure, a disparity typical of the whole experiment, and has been given the name Challenge (T_5). The process now picks up two terminal variables from the net, which form Texture (T_6).

After this new transformation, aspects of distance follow (Partiality, T_7), connected to the property of the texture that stimulate the judgment of whether the surface (the two sides) may provide Support (T_8) or not. Difference (T_9) shall then have an influence on Support, which means that some disparity is apprehended that restricts the supportive function of the glass sheet. This environmental change also means a change in motion, because of the perception of a risky place. The name chosen, Border (T_{10}), refers to something concrete, since the cliff edge is in fact real to the child, although virtual in the experimenters' environment.

Border is a cue term in the experiment. Therefore, at this node the process is making a leap, where Border, which is positioned in the coordinates (x=11, y=2), is merged with Challenge to form Affordance (T_{11}). The concept Affordance belongs to the Gibsonian

vocabulary of the ecological theory of perception, and it happens to be the starting point for the continuing description.

The landscape displayed in Figure 3 is essentially marked by three conceptual regions. The dividing line between the first region and the other two is Border, positioned in the valley at the back of the landscape. This place corresponds well to the experimental reality. The first group, consisting of Affordance and Allure, has to do with the stimulation situation. Affordance refers to environmental properties that come into view in an agent's flow field while moving, making him or her act directly. Once the agent has become aware of the affordances of the environment, a state of attunement comes about, making him or her attentive and develop actions to reach a certain goal or state. Since affordances are supportive for the action, they may be purposely constructed to stimulate certain behaviour. It is the role of the Allure to perform such stimulation in the experiment. Something had to be tempting for the child to make it move in the direction to and over the deep side. A conflict arises at the moment when the mother, to which the child is attuned, and the environmental affordances of a deep slope present themselves to the child.

The second region consists of Trust, Grasping, Courage and Hesitation, which refer to reaction patterns, either visible or inferred. A person who has Trust is filled with a feeling that there is nothing to fear in the situation. He or she is confident that the persons around act to the best, and that the environment can be relied on. The agent gets to know the environment through locomotion in which both body and sight act co-ordinately to build up invariants that help in unknown situations. Groping with the hands is a way for little infants to test their knowledge about surfaces and in the case that the tactile feeling is affirmative, although the visual information is not, Hesitation can be seen. The outcome of a groping activity may be Grasping, which tells the individual that this move is safe or it is not. By an effect of reassurance, the child would overcome the initial hesitating behaviour and show Courage while directing its attention towards the mother. However, when it finally has grasped that it may not be safe to continue, the fear of height in the insecure situation dominates the attraction of the mother.

The third region contains Performance, Moving, and Capability in the depth without which Achievement would not come about. Moving, that is, changing position, is the prerequisite for the experimenters to observe and interpret what is mentally moving for the exposed subject. When the coordination of body movement and visual perception gives evidence that the child has the ability to react accordingly to depth, it becomes possible to talk about Performance. Thus, it is a concept that strengthens the experimenters' Capability at the same time as it acknowledges the events on the "Visual Cliff" as reinforcing from the child's perspective. Because, one must not forget that a child placed on the board is supposed to perform, that is, it has a task to fulfil. To accomplish this idea, an outer agent is responsible, so therefore, the successful realization of the experiment is termed Achievement referring to both the events on the table and those governing them.

The last step in the presentation will be to show which orientation points are in the text producers' focus. An extraction procedure decides which T-values from the orientation form the intention structure (for procedure, see I. Bierschenk & B. Bierschenk, 2011, p. 28). As is obvious in Figure 4, showing the intention, the concepts do not appear as distinctly grouped as those in the orientation, since the extraction has a more curved line.

In the base region emerges Challenge in the foreground, although at the same height as Border, which shows up in the background. In the orientation, they were merged to form Affordance, which now has changed position in relation to Border. Allure, which is dependent on Affordance in the orientation, is now placed not far from Trust, because Border is no longer dividing them.
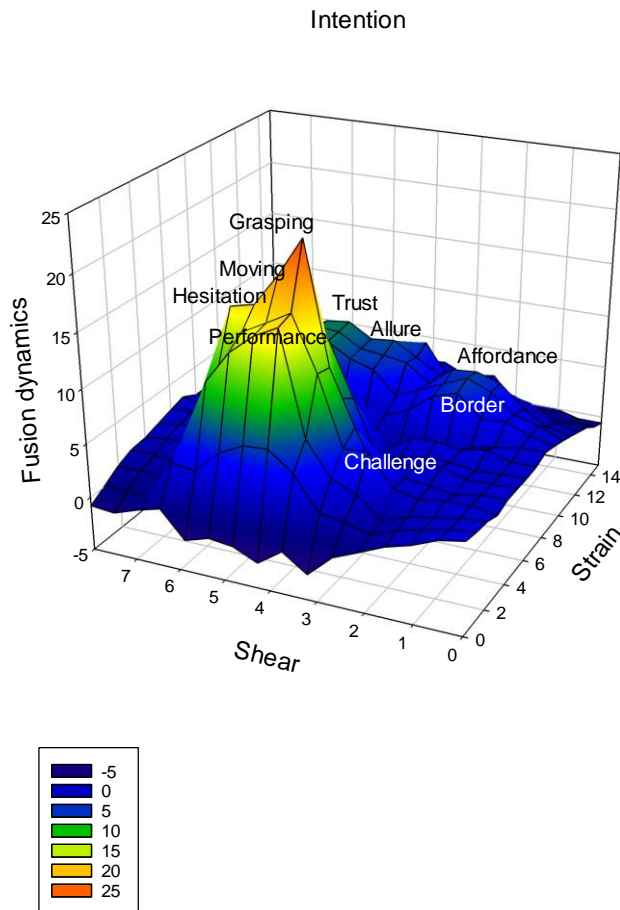
Figure 4 *Fusion dynamics for Visual Cliff: Intention*

The conceptual group that summarizes the behaviour events, which are concentrated at a formation that arises as the most important, consists of Hesitation and Performance at almost the same height, and Moving and Grasping at the highest peak. They are the most prominent aspects in the experimenters' perception.

Performance on the glass top turned out to be connected to the child's behaviour in the first place. The most important intentional aspect is Grasping, which refers to the moment when the child realizes that it cannot cross over the edge. The movements over the glass surface are the prerequisite for this reaction. Thus, it has been evident that the experimenters were able to come to a conclusion by observing the performance on the glass top.

Remarks

Two scientific perspectives have been built into "The Visual Cliff" experiment, one that can be termed functionalism and the other behaviourism. The way in which the simulation was applied, that is, the content of the experiment, can be described in behaviouristic terms. The infants were placed over the glass surface and were stimulated to give a response, which they did by a certain crawling behaviour. The idea behind the design of the proper apparatus is functionalistic (I. Bierschenk, 2001).

This double aspect is also represented in the researchers as well. James J. Gibson had designed the experiment based on the ecological theory, which is a functionalist idea, whereas Eleanor Gibson in her role of pedagogue has performed the study with her methodological background in the behaviourism. A discussion of the history of the experiment is given by Gibson himself in the posthumous writings edited by Reed and Jones (1982, pp. 90-101).

Therefore, it is not surprising to find concepts from both scientific ideas in the information structure.

By comparing the graphs that show the text development, we can observe a common phenomenon that relates to the interaction between variables (O) and (A). When separated, as they are here, the two spaces usually get complementary shapes. Where the graph in Figure 1 forms two deep dips at both ends, the graph in Figure 2 forms two dips in the middle, of which one is deep. For the rest, any complementarity is not that apparent, which should be the result of the text being a description of a picture series. The synergistic parts can be explained by the Kantian approach (B. Bierschenk, 2018), that the knowable encloses the knower in an axiomatic way. This axiom leads to a meaningful description of the agent through the objective.

Depicting an Internal Reality

The significance of the Visual Cliff experiment is that the underlying ecological theory of perception could be confirmed in the sense that it has given clear indication of the genetic conditions for depth perception and that its manifestation enhances with moving experience. Moreover, the textual formulation of this knowledge has proved that language directly picks up the ecological coordinates, orientation and intention, and conveys their interplay exactly as expected. In the continuing study, this result will be used in transformed sense. In the same way as the glass top, transparent and free from dust, was the medium for the experimenters to judge the child's immediate reaction to its reality, language may be seen as medium for direct perception, provided that it is free from semantic ballast or other types of noise. In the real world, "direct depiction" is the mechanism at work when the cognitive level is not reached in the processing.

Swedish Academy's Nobel Prize Formulation

The Swedish Academy's short motivation to Tomas Tranströmer's Nobel Prize in 2011 will serve as intermediary link between the scientifically founded text and its contrast, namely a poem. The formulation reads as follows: *För att han i förtätade, genomlysta bilder ger oss ny tillgång till det verkliga* (Because, through his condensed, translucent images, he gives us fresh access to reality. Transl. by Svenska Akademien, 2011). There is great interest for the winner and for the prize motivation. Hence, it can be assumed that the Academy has formulated the motivation with extra care. With knowledge of Tranströmer's work, it is easy to read out a worldview, the orphic tradition and a view of language based on the Academy's formulation. However, even a very short text like this can hide a structure to which the superficial relationships do not give immediate access.

Figure 5 shows the flow dynamics in the Academy's formulation. The flow in the objective is linear and forms a smooth, steep texture with very few irregularities. The agent makes a twist, however, and shows that there is a deviation in the flow, which occurs before the verb 'gives'. This difference in dynamics provides evidence of the particular intention that should be given in a statement like this. That this shift implies different energy levels in the two components has to do with their mutual relationship, which the fusion graphs in Figure 6 demonstrate. Due to the brevity of the material, the transformations are presented in their entirety.

The maximum energy value of the orientation indicates that Border is the key point. Border or boundary is a point of intersection, where the optical array is broken in order for the organism to distinguish something that is significant for accessing experiences, that is, Depth Perception.
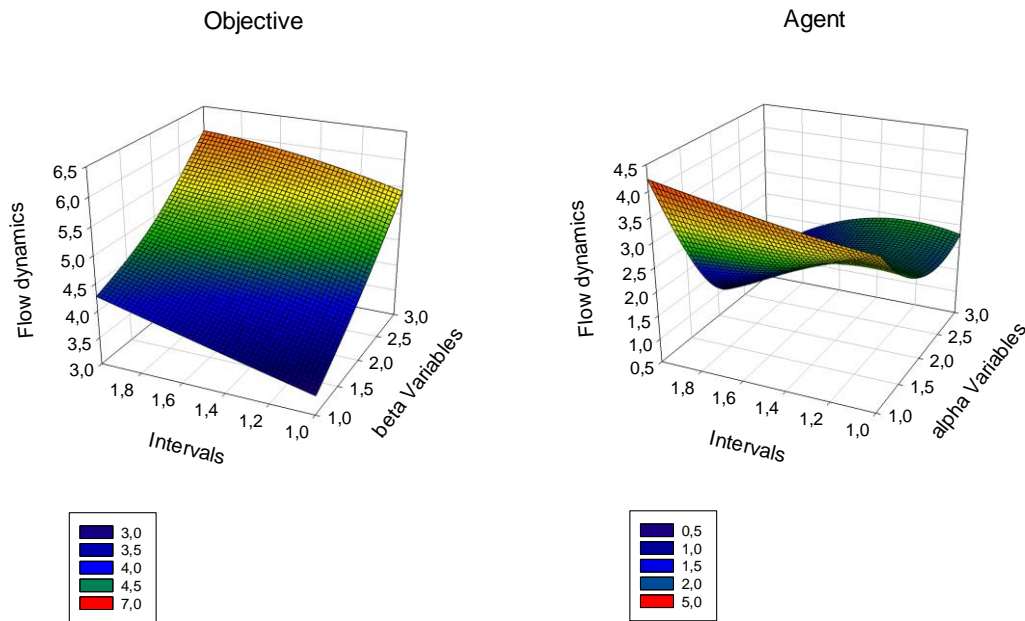
Figure 5 *Flow dynamics for the Nobel Prize formulation*
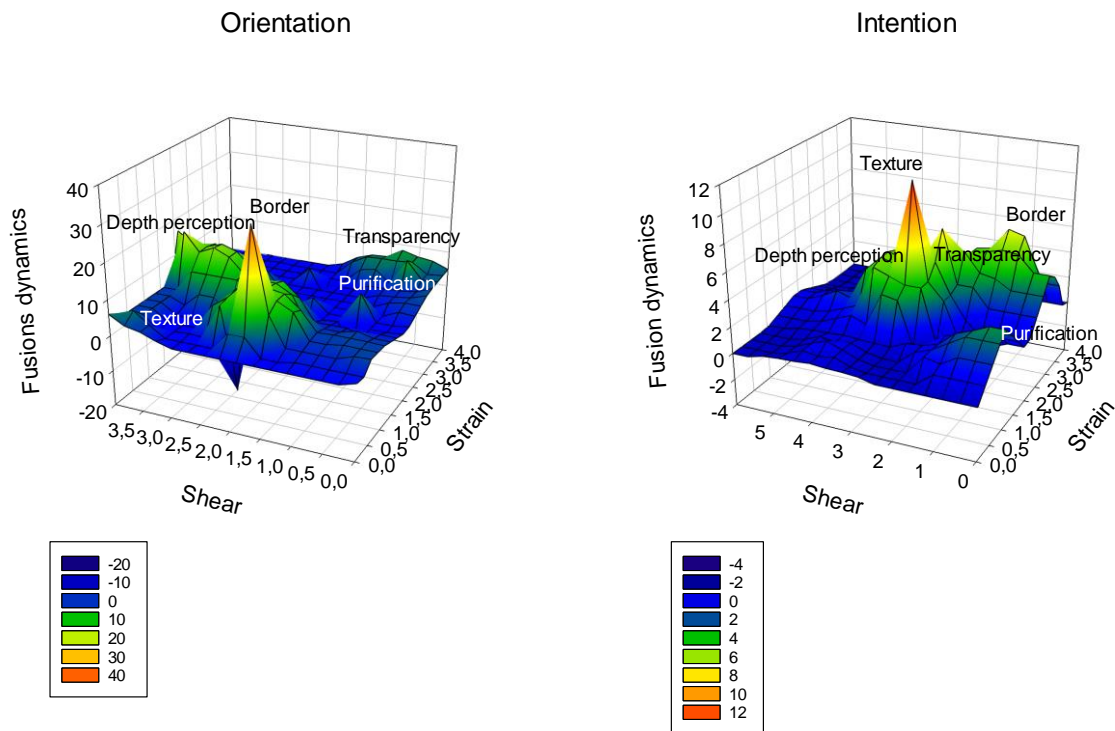
Figure 6 *Fusion dynamics for the Nobel Prize formulation*

This means that the borderline separates levels or creates perspectives. For depth perception to come about there must be tools that can generate Transparency, which is achieved by the Purification of a surface or medium that needs to be free from disturbing elements. The border is so far immaterial but when the depth has been materialized so that the organism has experienced a Texture through the purified surface, the border itself becomes possible to adopt with the senses.

As expected, the objective is reflected in the agent, although with some positional changes. In the intention graph, the "sensual" Texture is extracted in the first place, followed by Border and Transparency. Transparency occurs twice, which means that a feedback (loop) takes place in the fusion. Purification, which is the prerequisite for the texture to be transparent, and Depth Perception, which is a result of the textural movements, have not been of considerable import. This constellation says that the transformations in the intention have mainly crystallised what can be perceived directly.

Tranströmer's Poem

Short poems are typical for 20th century Modernism. The poetic technique of Tomas Tranströmer is characterized by rejection of epic elements and verbosity in favour of precision and maximal concentration. Commonplace language because of its lack of expressivity should be avoided through exact and visually conditioned poetry.

One of the many short poems is *Från mars -79* (From March -79), published in the collection *Det vilda torget* (The Wild Market Square, 1983). This poem has been analysed in a context where it was put in relation to three other poems by Tranströmer, which were written within a certain time span (I. Bierschenk, 2017). The poem has the following wording and typographical layout (Tranströmer, 2001, p. 294) (literal translation by the present author):

Trött på alla som kommer med ord, ord men inget språk	Tired of all who come with words, words but no language
for jag till den snötäckta ön	I went to the snow-covered island.
Det vilda har inga ord.	The wild has no words.
De oskrivna sidorna breder ut sig åt alla håll!	The unwritten pages stretch out in all directions!
Jag stöter på spåren av rådjursklövar i snön.	I come across tracks of deer hooves in the snow.
Spräk men inga ord.	Language but no words.

All presentations build on data from the Swedish version. Figures 7 and 8 depict its flow dynamics. Table A2 in Appendix presents the flow chart.

The objective shows a relatively differentiated movement forward in the first four intervals, while in the last, fifth interval it moves at a somewhat higher but even level. Two places are distinguished. In the first interval, a sharp upward move occurs, which gives the highest value of the extension. This occurs by the phrase (*kommer med ord* / come with words), where the basic magnitude of the variable is high through the pointer after the verb. The second distinction in the flow is the depth in the fourth interval, where the beta variable is a placeholder after the verb and retrieves a root. The same applies to the second interval after the pointer (*till...* / to…).

The agent shows a more evenly flowing movement than the objective but it has a low extension. The repetitions, which are characteristic of the agent, become a particular feature of this flow, which is due to the repetitions following the differentiation at the objective side, especially in the last interval. The highest point, appearing as an upswing in the first interval, is formed by (*Trött på alla som* / Tired of all who). There is no distinctive minimum value, but three alpha variables (*den, De, jag /* the, The, I) that lie around the same magnitude and are distributed within three of the intervals, which contribute to the appearance of smoothness.

In the landscape of the objective, a texture is laid out, the description of which is based on a gradual accumulation of observations, whose values must be folded in such a way that all appear without being concealed. Depth can be said to be the reason for this manoeuvre, so therefore the diagonal shows a dividing line (folded edge). The same phenomenon, but on another level, is reproduced in the Visual Cliff experiment in the sense that the deep-sided checker squared pattern was gradually adjusted by the size of the squares into a sloping line in order to project the impression of depth.
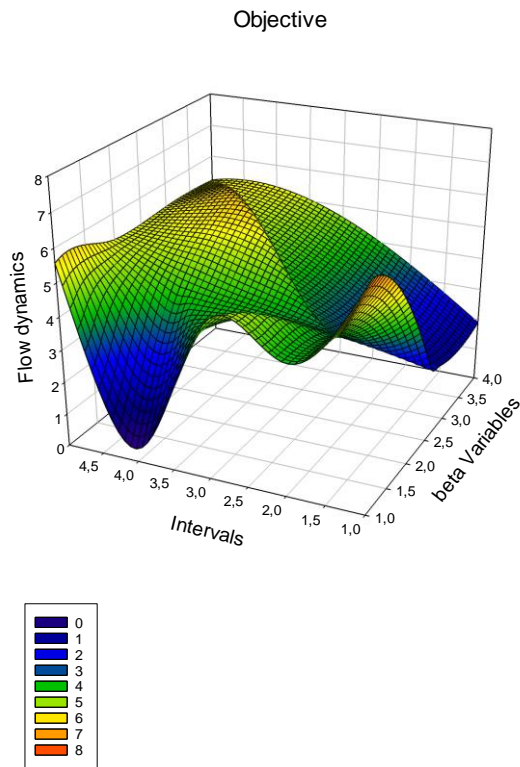
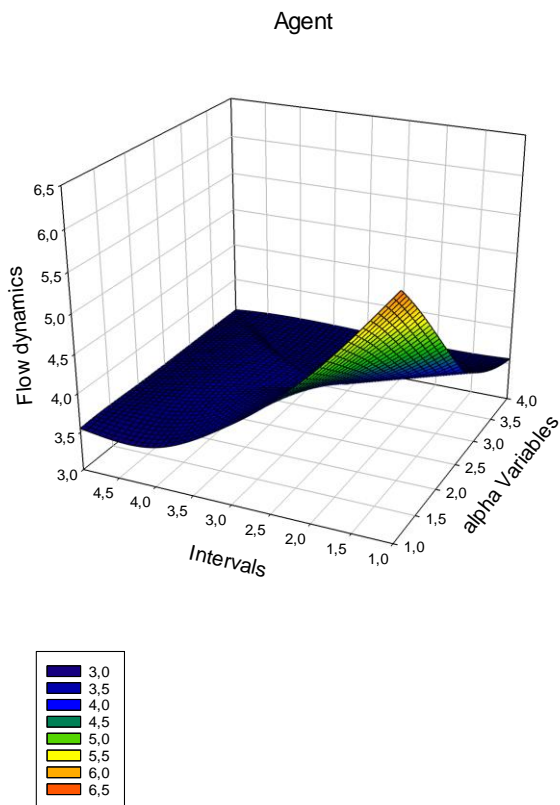**Figure 7** *Flow dynamics for Tranströmer's Poem: Objective*

Figure 8 *Flow dynamics for Tranströmer's Poem: Agent*

The edge is also reflected in the landscape of the agent. One can say that the graphical display of the time sequence of the magnitudes reveals the natural disparity built into the activity of seeing, perceiving and depicting a reality through the interacting alpha and beta variables. Whether the flow dynamics have its equivalent in the information concentration remains to be investigated, starting with the orientation dimension as shown in Figure 9.

Naming the variables and singularities may be a sophisticated undertaking (I. Bierschenk & B. Bierschenk, 2011, p. 28), when an established theory is not at hand. For example, background knowledge of the author of a text should not have any influence on the choice of alternatives. Most researchers in literature science today express their interest in relying on the text itself and not on biographical data for literary interpretation. However, the "text itself" can be conceived either in terms of semantic/lexical interpretation of words and phrases or be transformed into abstract terms designating concepts, which is the relevant approach here and implies thinking in activity terms. To illustrate what this means in practice, the first transformations underlying Figure 9 may help.

X	Y	Node	Value	Transformation	Translation
0	1	D	0		
1	0	2	3.9564	for jag	I went
1	*1*	*T₁*	*3.9564*	*Rörelse*	*Movement*
2	0	D	0		
3	0	3	2.615146	till (den+snötäckta ön).	to (the+snow-covered island)
3	*1*	*T₂*	*2.615146*	*Dragningskraft*	*Attraction*
1	1	T₁	3.9564	Rörelse	
3	1	T₂	2.615146	Dragningskraft	
3	*2*	*T₃*	*6.571546*	*Förändring*	*Change*
4	0	D	0		
5	0	4	4.4588	snötäckta ön	snow-covered island
5	*1*	*T₄*	*4.4588*	*Övertäckning*	*Covering*

The first string to get a name is (*I went*) in the coordinates (x=1, y=0). Further reading of the poem reveals that the "I" may be interpreted as a pronoun for the poet himself, who is tired of his present situation and wants to escape for a while. Therefore, Escape can be a relevant name. When this extra-textual context is rejected, then the choice based on lexical meaning would be a name for a kind of journey, for example Trip. However, the activity symbolises a movement displacing one's own body purposely. The choice made was a name for the kind of locomotion that incorporates a measure or distance, not a quick move or gesture, thus Rörelse (Movement).

The string sequence (*to (the+snow-covered island)*) says that the pointer takes a shadowed variable, made implicit from the explicit variable underlying T_4. The explicit (*snow-covered island*) lexically seen would incorporate 'snow' and 'covered' into the name-giving as well as 'island', maybe also the fact that snow is white. In that case, the ground under the snow is difficult to see, so a possible name for T_4 can be Invisibility. This concept would then be added to the shadowed string above, which means that the details of the island become implicit in the new name, for example Expanse. With a systemic view in mind, the word 'island' signals separation and isolation, whereas 'covered' says that it cannot be observed in its normal shape. Snow and white are of no general import, as also perceptibility from an observer's point of view. Thus, (*snow-covered island*) has been abstracted to Covering. Now, the name of (*to (the+snow-covered island)*) at (T_2) should incorporate Covering into the parenthesis and be the filler to the pointer. The word 'the' means determining the place as normally known, and the pointer 'to' signals direction, that is, towards the point out there. The parenthesis signals implicitness, which has led to the name Attraction, emphasizing that the hidden structure is causing the response.
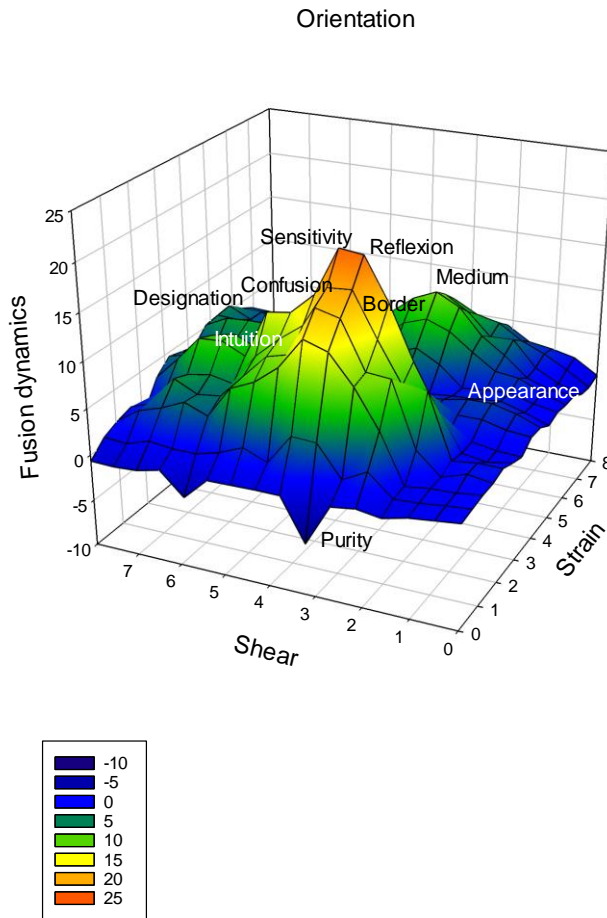
Figure 9 *Fusion dynamics for Tranströmer's Poem: Orientation*

Finally, these two transformations, Movement and Attraction, shall be fused into higher concentration at (T₃). When a fusion takes place, the latest value influences the former, which implies that the empirical meaning of Attraction is absorbed in Movement. The suggestion for this transformation is Change, a concept whose empirical meaning is the instance of becoming different, a momentum, which includes physical movement as necessary for mental movement. A semantic suggestion could have been the fusion of Trip and Expanse, leading to a state in which the observer is included, such as Solitude or similar. This suggestion indicates a presumed intention or the animation of nature, which goes too far.

Figure 9 will now be presented with focus on three regions. The first region contains three significant points, namely Appearance, Medium, and Border. In following the path, Appearance is the next singularity to reach at T₅, which encompasses Change and Covering in the lower region. This constellation means the perception that something has been altered with the help of a concealing shelter, so Appearance tells nothing about which the activities may be, only that there exists something presenting itself. When the environment does not appeal to vision, it may appear through elements appealing to the hearing. However, this landscape does not speak with words (*has no words*), so whatever it conveys, it is unspoken. Nevertheless, it is perceived. Moreover, its texture extends widely (*stretch out*), which has led the naming to the widespread and unbounded Silence.

Silence shall now be merged with Appearance to form the next higher concentration point along the path. Anything unspoken should be considered as existing in some dimension and will become sensed when its appearance is appealing enough. The carrier of that

dimensionality can be termed Medium. In this connection, Medium shall be understood in its functional meaning, that is, to be a "converter" between outer and inner, in both directions. Boundlessness, conceptualized from (*in all directions!*) is a concentration point that has an influence on Medium at this stage in the process. Boundlessness stands for the perception of the immenseness of the outer environment as well as the infinite character of an inner environment, timeless as it is. Since the function of a Medium is to put restrictions or limitations on infinity, this fusion is named Border.

The second region is dominated by the internal concepts Intuition and Confusion. The pathway concerns perception of signs of being in an environment that presents variable expressions for communication. Two concentrations are integrated in Intuition, one that was given the name Designation and was positioned at a lower height. Designation denotes that imprints made by someone or something has crossed the same trajectory (*come across tracks*) as the experiencer and has left behind marks that can be identified (*of deer hooves*). Thus, the term stands for familiarity with the observed. Different kinds of media may serve as carriers of meaningful signals for an attentive observer. This context expresses a non-vibrating but important indicator of the presence of something significant, here (*in the snow*) and (*Language but no words*). The term chosen for this indication is Tonlöshet (Unvoiced), which together with Designation forms a transformational step towards Intuition, a term that corresponds to direct perception. Sensitivity to the unspoken and unvoiced implies that disturbing factors may burden the directness of intuitive action. Ordighet (Verbosity) is one such interfering factor (*come with words*). The process of reading and identifying a script rests on the clearness of the characters and their possibility to convey meaning transparently. Should the process fail, it is the result of Confusion. Confusion in this structure means that there is little tolerance for distracting noise, which influences the Border; its restrictive function is at risk. That this negative influence is of great significance is demonstrated in the third region.

The third region collects *Sensitivity*, *Purity*, and *Reflexion*:

X	Y	Node	Value	Transformation	Translation
2	4	T_9	26.042846	Gräns	Border
2	6	T_{14}	27.9611	Störning	Confusion
2	**4**	**T_{15}**	**54.0033746**	**Känslighet**	**Sensitivity**
0	4	D	0		
0	3	6	0.406971	oskrivna (sidorna+breder ut sig+åt alla håll!)	unwritten (pages+stretch out+ in all directions!)
1	**3**	**T_6**	**0.406971**	**Renhet**	**Purity**
2	4	T_{15}	54.0033746	Känslighet	Sensitivity
1	3	T_6	0.406971	Renhet	Purity
2	**3**	**T_{16}**	**54.4103456**	**Reflexion**	**Reflexion**

Usually, when the fusion takes place, the last node adds some information to the first, whose value is higher. In this case, (T_9) is attracting (T_{14}) from the higher region to form (T_{15}). In this way, Sensitivity indicates great preparedness to react to a barrier, whether it is virtual or real. Sensitivity in the context of Confusion and Border refers to the balancing between inner and outer, between invisible and visible, and between unheard and heard. At this stage one more distinction is added, namely unwritten (versus written). Implicit in unwritten are elements of Unspoken and Boundlessness, both related to the non-presence of constraints. Therefore, this kind of Tabula rasa has been termed Purity. The deeply ingrained concept of Purity has an influence on the established Sensitivity, which expresses the experiencer's responsiveness to what the environment affords. Just as light becomes reflected against a pure surface, the sensitive mind reacts with considerations, supported or facilitated by the purity of

the observed. With this try to clarification, the last concentration process evolves as Reflexion. This final concept shall be conceived as external and internal simultaneously.

Figure 10 shows the structure of the intention. Extracted from the orientation are those concentration points that evolve as the most important in the text, although not necessarily made conscious to the text producer. When the concepts have been placed in a similar manner in the intention as in the orientation, it means that the perspective has not changed, that is, the structure is conceived from the same angle. In the present case, the perspective is twisted, which presents itself through a different order and position.
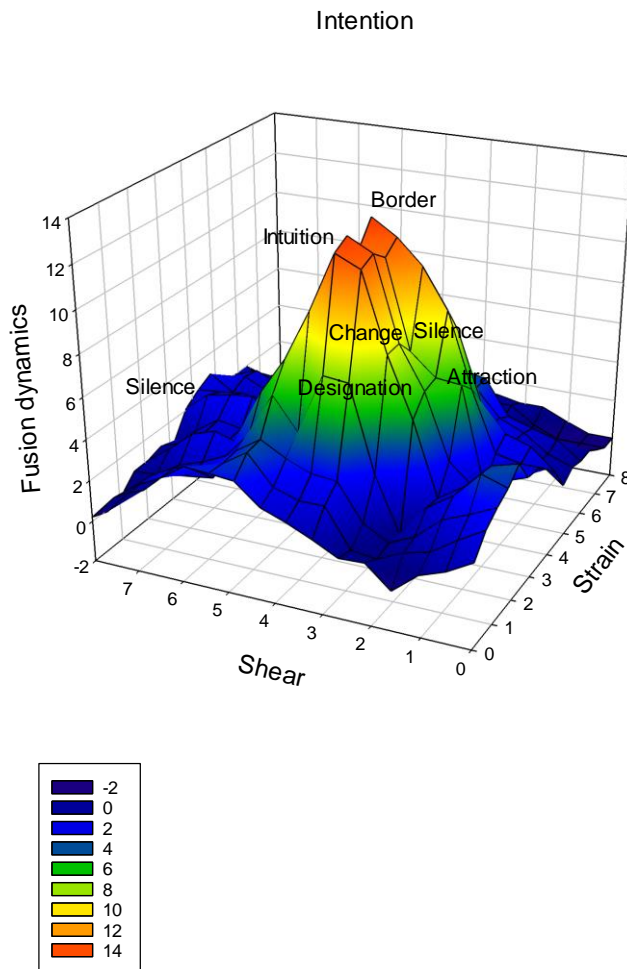
Figure 10 *Fusion dynamics for Tranströmer's Poem: Intention*

On top is placed Border, which implies that the turning point in the orientation where outer and inner meet (at Medium and Boundlessness) has high significance. The unspoken is characteristic of poetry, which is illustrated by Intuition as the next most important concept. As was already mentioned, it happens that short texts are characterized by looping in the extraction procedure. In this text, there are several concepts that are occurring more than once. Especially Silence appears three times, but has two positions in the graph, according to two relative high values. Change is of almost equivalent import as Silence. Likewise, Designation and Attraction are positioned at medium height.

In principle, concepts pertaining to psychology and communication are not at all in the perspective compared to the orientation. Attraction, Designation, and Silence are concepts abstracted from material strings, which initially have low values, but they have been increased

in the intention. This implies that the outer environment is in focus. Border and Intuition behave contradictory to this observation. Intuition, as a theoretical concept, increases its intentional value compared to the orientation, and Border is almost doubling its value when the intention is reflected through the orientation.

Border stands out as the synthesis in the poem *Från mars -79*. It is rarely the case that the most concentrated attractor in a conceptual net is the same in both dimensions. Border integrates aspects that may be perceived visually, but to a certain degree also Silence. It is worth noting that the perspective on Silence is variable. On the one hand, it is placed in the same region as Change and Attraction, which connects it to the environmental side of the perspective, and on the other, it is placed in the base region supporting the focal points, Intuition and Border.

Discussion

Literature science works with a number of methods for analysis and description and several methods are often used in parallel. No matter what approach, for a method to establish theory, an explication of concepts and their structural relationships is required. For comparisons, Table 1 presents a summary of the most profiled concepts that the three analyses have given. These are the final concepts, which means that they collect the highest concentrated energy.

Table 1 *Profiles of the texts from Visual Cliff,
        Swedish Academy, and Tranströmer poem*

Text	Intention	Orientation
Visual Cliff	Performance	Achievement
Swedish Academy	Texture	Border
Tranströmer poem	Border	Reflexion

No matter with which eyes you look at the results, duality can be conceived. Between the two concepts Performance and Achievement is a dividing and at the same time a unifying line that depends on the experimental presuppositions. Referring to the AaO-model, the inner and outer parenthesis in co-operation have been realised in the sense that the theoretical concepts pertain to the fulfilment of a task from both the child and the scientists. In case of the literary context, duality can be observed between the Prize motivation and the text aimed to be its evidence. The sensitive insight shown by The Swedish Academy indicates Border in their orientation. To the Academy members, Border is connected to the surface elements, since Texture stands out as their intention, quite consequently, because their profession is to judge textual materials. In the poetic text, Border is closely related to Intuition in the transformational structure, which makes it an inner phenomenon. It follows that the complementarity between the Academy's formulation and the poem is further enhanced by Reflexion such that it unifies outer and inner, as in a mirror.

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Appendix

Table A1 *Flow chart: Visual Cliff Text*

Time

Child's Depth Perception	α_1	β_1 *is (Child's Depth Perception)+(tested on the Visual Cliff.)* $\theta=0.282097$
$\phi=4.7728$		
Channelling *(Child's Depth Perception)* $\phi=3.315326$	α_2	β_2 *tested on the Visual Cliff.* $\theta=7.0821$
The apparatus $\phi=4.1448$	α_3	β_3 *consists of a board* $\theta=6.0372$
; Channelling *(The apparatus)* $\phi=3.464122$	α_4	β_4 *laid across a sheet* $\theta=6.0372$
Repetition $\phi=3.464122$	α_5	β_5 *of heavy glass* $\theta=5.4954$
, with a + $\phi=3.2096$	α_6	β_6 *patterned material directly* $\theta=4.8670$
Repetition $\phi=3.2096$	α_7	β_7 *beneath the glass* $\theta=5.6115$
Repetition $\phi=3.2096$	α_8	β_8 *on one side* $\theta=5.3793$
Repetition $\phi=3.2096$	α_9	β_9 *and several feet* $\theta=4.5216$
Repetition $\phi=3.2096$	α_{10}	β_{10} *below it* $\theta=4.9149$
Repetition $\phi=3.2096$	α_{11}	β_{11} *on the other.* $\theta=5.8437$
Channelling $(\alpha_6) + (\beta_6\beta_7\beta_8\beta_9\beta_{10}\beta_{11})$ $\phi=-9.16659$	α_{12}	β_{12} *Placed on the centre board* $\theta=6.6564$
, the child $\phi=4.3646$	α_{13}	β_{13} *crawls to its mother* $\theta=6.0759$
Repetition $\phi=4.3646$	α_{14}	β_{14} *across the shallow side.* $\theta=6.6177$
$(\alpha_{13}) + (\beta_{13}\beta_{14})$ $\phi=-0.84659$	α_{15}	β_{15} *called from the deep side* $\theta=6.6177$
, he $\phi=3.8622$	α_{16}	β_{16} *pats the glass* $\theta=4.4588$
, but despite this tactual evidence		*is in fact a solid surface*

that the cliff ϕ= 7.2848	α_{17}	β_{17}	θ=7.0047

, he
ϕ= 3.8622

α_{18} — β_{18} *refuses (to (he))+(cross over (to the mother.)*
θ=-2.23448

Channelling *(he)*
ϕ= 3.534752

α_{19} — β_{19} *cross over (to the mother)*
θ=-2.22548

Repetition
ϕ= 3.534752

α_{20} — β_{20} *to the mother.*
θ=5.8824

Table A2 *Flow chart: Tranströmer Poem*

Time

Trött på alla som ϕ=5.9598	α_1	β_1	*kommer med ord* θ=6.6882
, ord men inget språk ϕ=5.2438	α_2	β_2	*for jag* θ=3.9564
Repetition ϕ=5.2438	α_3	β_3	*till (den + snötäckta ön)* θ=2.615146
den ϕ=3.5482	α_4	β_4	*snötäckta ön.* θ=4.4588
Det vilda ϕ=4.0192	α_5	β_5	*har inga ord.* θ=4.7414
De ϕ=3.5168	α_6	β_6	*oskrivna (sidorna + breder ut sig + åt alla håll!)* θ=0.406971
sidorna ϕ=3.6738	α_7	β_7	*breder ut sig* θ=4.4274
Repetition ϕ=3.6738	A_8	β_8	*åt alla håll!* θ=5.8437
Jag ϕ=3.5482	α_9	β_9	*stöter på spåren* θ=5.5728
Repetition ϕ=3.5482	α_{10}	β_{10}	*av rådjursklövar* θ=5.2245
Repetition ϕ=3.5482	α_{11}	β_{11}	*i snön.* θ=5.2632
Repetition ϕ=3.5482	α_{12}	β_{12}	*Språk men inga ord.* θ=5.2124